FSN-FB 0004

BODY CHARACTERISTICS, YIELD INDICES AND PROXIMATE COMPOSITION OF HORSE EYE MACKEREL FISH (*Caranax carangus*)

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This paper was prepared for presentation at the 25th Annual International Conference and Exhibition in Administrative Staff College of Nigeria (ASCON), Topo-Badagry, Lagos, Nigeria, 25th – 29th October, 2010.

ABSTRACT

Size measurements, anatomical composition and proximate composition of Horse eye mackerel fish (Caranax carangus) were carried out. The mean values of length (cm) and weight (g) were 21.79 ± 1.76 and 87.96 ± 21.4 respectively. Anatomical fractionation showed that the fish samples contained on the average 45.8% fillet, 17.75% head, 25.98% body frame and 6.12% gut. The proximate composition analysis showed that the fish sample contained 77.2% water content, 0.4% lipid, 20.63% protein and 1.67% ash. Horse eye mackerel fish thus constitutes a source of high protein as well as an ideal dietetic fish food.

Keywords: Weight, Length, Anatomical, Chemical Composition, Horse eye mackerel fish.

INTRODUCTION

Fish and fish products are known worldwide as a very important diet because of their high nutritive quality and significance in improving human health. Fish plays a vital role in feeding the worlds population and contributing significantly to the dietary protein intake of hundreds of millions of the populace. On a global scale, almost 16 percentage of total average intake of animal protein was attributable to fish in 1988 (FAO 1990). In the developing worlds, fish is a highly acceptable food that supplies as much as 40 percent of all animal protein available of the countries where fish is the main sources of animal protein, 39 out of the top 40 are found in the developing world. However, fish which contributes 36.6gm per day of net protein utilization in Nigerian homes is still below the recommended requirement by the world health organization (WHO). Moreover, the poor spend proportionally more on fish than on meat or other sources of animal protein. Fish has an edge over meat in that it is cheaper and relatively more abundant in Nigeria. (Eyo, 1986). Stansby (1954) established that information on the chemical composition of fish in respect to the nutritive value is important to compare with other source of animal protein in foods such as meat and poultry products.

In fish processing, the knowledge of proximate chemical composition of fish is very important, even as information on the lipid, protein, ash and water content is required for effective utilization. It is also essential to determine the proximate composition of the fish to report its nutritional composition from the public health point of view. Thus studies on fish composition and fish yield are essential if fish and fish products are to be maximally utilized. This work reports the body

characteristics, yield indices and proximate composition of Horse eye mackerel fish *(C.carangus)* caught in the costal waters of Lagos State Nigeria.

STUDY SITE

Fresh fish samples of Horse eye mackerel fish (*C. carangus*) were obtained from the Makoko fish market in Lagos. The fish samples were kept on ice in an insulated box and transported to the Nigerian Institute for Oceanography and Marine Research, Victoria Island Lagos for further analysis.

MATERIALS AND METHODS

Body Characteristics and Yield Indices Determination

Body characteristics and meat yield indices were determined using forty five fresh samples of Horse eye mackerel fish. The fish samples were first weighed whole using Ohau's top loading electronic weighing balance. The total, standard and head lengths were measured using a standard graduated fish measuring board. The fish was be-headed, gutted and filleted. The separate parts were weighed each (in grammes) to determine the percentages compared to the local body weight.

Analyses

Fish samples were randomly selected for proximate composition. Triplicate determinations were carried out.

Proximate Composition Determination

The fillet of the fish samples were homogenized and used to determine proximate composition. The moisture content was estimated by drying samples to constant weight at 103 ± 2^0C using the oven dry method (AOAC, 1994). Lipid determination was carried out using the modified Bligh and Dyer procedure (AOAC, 1994), the ash content of the fish was determined by igniting the sample at 550^0C for 5-6 hours until the sample was completely free from carbon particles in a carbolite Sheffield LMF3 muffle furnace while the total nitrogen was determined by the Kjeldahl method as described by Vlieg, 1984 and a factor of 6.25 was used for converting the total nitrogen to crude protein content of the fish sample.

RESULTS

The body characteristics of horse eye mackerel fish (*C. carangus)* were measured as shown in table 1. The fish samples had a standard length range from 15.60 - 20.2 cm, total length range from 15.60- 20.2 cm and total body weight range from 61.99 - 127.44 g and the total head length range from 10.82 -12.7 cm.

Table 1: Body Characteristics of Horse eye mackerel Fish (*C. carangus*)

Fish Parameter Measured	Horse eye mackerel Fish (*C. carangus*)
Total Weight (g)	87.96 ± 21.4 (R= 61.99 -127.44)
Total Length (cm)	21.79 ± 1.76 (R= 19.1 – 25.2)
Standard Length (cm)	17.50 ± 1.28. (R= 15.60 - 20.2)
Head Length(cm)	15.65 ± 4.11 (R= 8.82 – 20.94)

Data are mean± SD and R= range

The yield characteristics of horse eye mackerel (*C. carangus)* as shown in table 2, showed a percentage decrease in the order of fillet, frame, head and gut of the fish samples. The order was 45.8 > 25.98 > 17.75 > 6.12.

Table 2: Yield Characteristics of Horse eye mackerel Fish (*C. carangus*)

Fish Parameter Measured	Horse eye mackerel Fish (*C. carangus*)
Gut As % Of Whole Fish	6.12 ± 1.73 (R= 2.63 – 10.81)
Head As % Of Whole Fish	17.75 ± 2.01 (R= 10.82 - 20.94)
Fillet As % Of Whole Fish	45.8 ± 1.67 (R= 26.21 - 59.35)
Frame As % Of Whole Fish	25.98 ± 2.61 (R= 15.97 - 31.96)

Data are percentage ± SD, R=range.

The results of the mean proximate composition of C .*carangus* are presented in figure 1.The fish specie had mean protein content of 20.63 %, lipid content of 0.4 %, water content of 77.3 % and ash content of 1.67 %

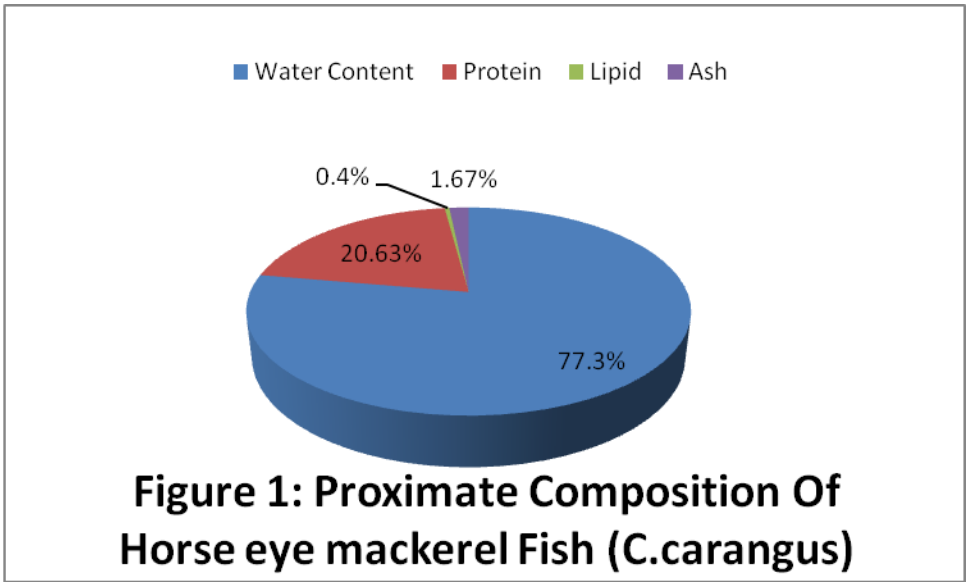

Figure 1: Proximate Composition Of Horse eye mackerel Fish (C.carangus)

DISCUSSION

The mean length and weight of horse eye mackerel fish presented in Table 1 were 21.79 ± 1.76 and 87.96 ± 21.4 respectively. There were slight variations in sizes with respect to length and weight. This result was with respect to size, and could be due to interplay of factors affecting growth such as nutritional, physiological, biotic and climatic factors.

The result of yield indices in table 2 showed that the percentage yield of the edible flesh for horse eye mackerel fish (C. carangus) was 45.8%. This was gotten from the total of filleted skin of the fish sample, the remaining parts such as the head, gut and scale are regarded as waste. The fillet yield of 45.8% when compared to the entire percentage of the fish body weight, could be attributed to the feeding habit of the fish as a carnivore feeding on small fishes and crustaceans and the bony structure of the fish (Froese and Pauly, 2010)..

The anatomical measurement of the fish gave an average of 23.87 % waste (i. e 6.12% gut and 17.75 % head) and 71.9 % body trunk (i.e 25.98 % body frame and 45.8 % fillet). The yield of edible portion of 71.9% of the fish will make the fish a good source of raw material for canning and other value added products (Egwelle *et al* 1986). However, the waste recovered can be used

for fish meal or silage production for animal feeds.

The results of the proximate composition of the fish showed that it is a high protein fish (15-21%) since its protein content is 20.6% with low lipid content of 0.4% . Fishes with lipid content below 5% are considered lean (Ackman,1989, Stanby,1982) hence horse eye mackerel fish can be considered to be a lean fish. The low lipid content value might be as a result of the environment and the type of diet the fishes feed upon. Its high protein content would make it an ideal source of animal protein that can be used in food preparation and in fast food outlets for the manufacture of fish pies, fish fingers, fish burgers and cakes.

The water content of the fish was found to be quite high 77.3% was within the previously reported range in other fishes. (Gallagher, *et al* 1991). FAO report of 1999 states that water content and lipid content are inversely related and their sum is approximately 80% with other components accounting for the remaining 20 %.

Ash content of the fish which was in the high range of 1.67 % indicated that horse eye mackerel fish is a good source of minerals such as calcium, potassium, zinc, iron and magnesium.

CONCLUSION

The results of the experiment showed that horse eye mackerel fish has a high yield of edible portion making it suitable for canning and other value added product. It is also a suitable source of animal protein useful for controlling diets.

ACKNOWLEDGEMENTS

I wish to acknowledge Dr. G.R. Akande, H.O.D of Fish Technology/Biotechnology Department and Mr. M. Akinwale of the same department for their constructive criticism on this study.

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